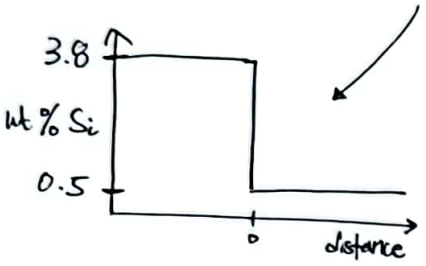
상변태론 HW#3

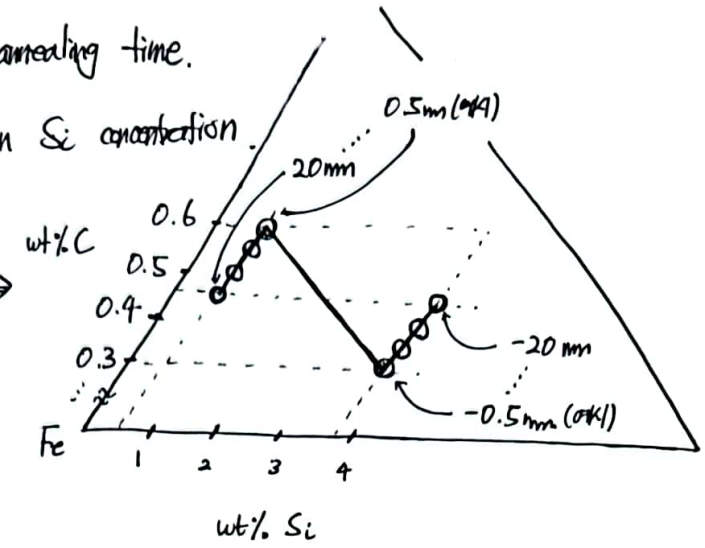
20222660 이상근

1. ① diffusion path for 8 days annealing time.

⇒ assumed abrupt change in Si concentration.



⇒

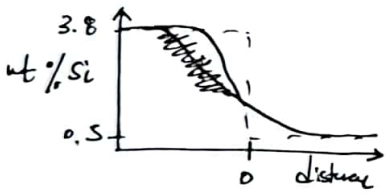


C의 wt% 가 높은 부분은 상대적 Si의 wt% 가 높아 μ_c 가 상대적 높음.

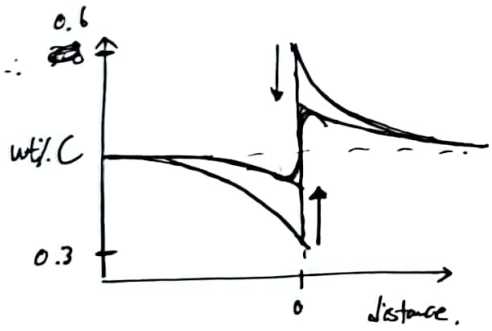
C의 wt% 가 높은 부분은 2 번째.

② diffusion profile & path for longer annealing time.

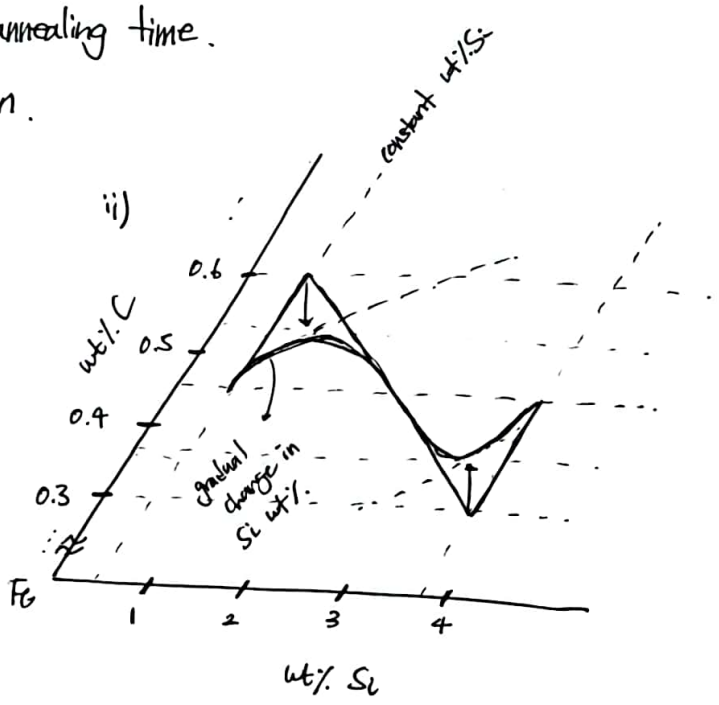
⇒ gradual change in Si concentration.



i)



ii)

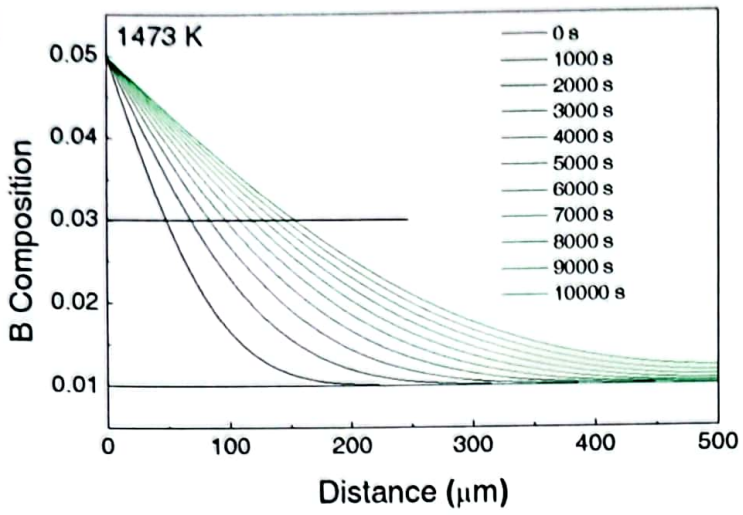


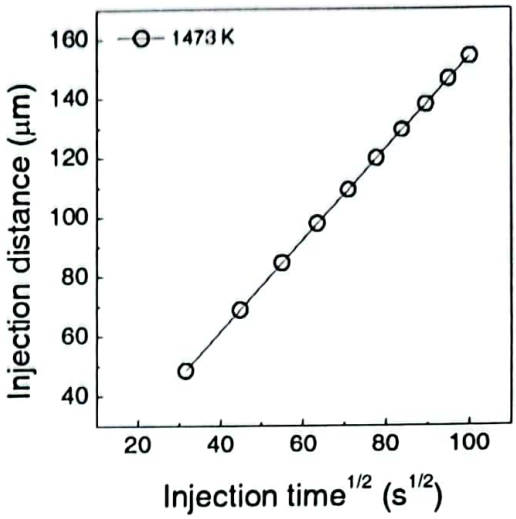
C의 농도차가 줄어들 것임.

상변태론 HW #3

20222660 이상준

2. (a)

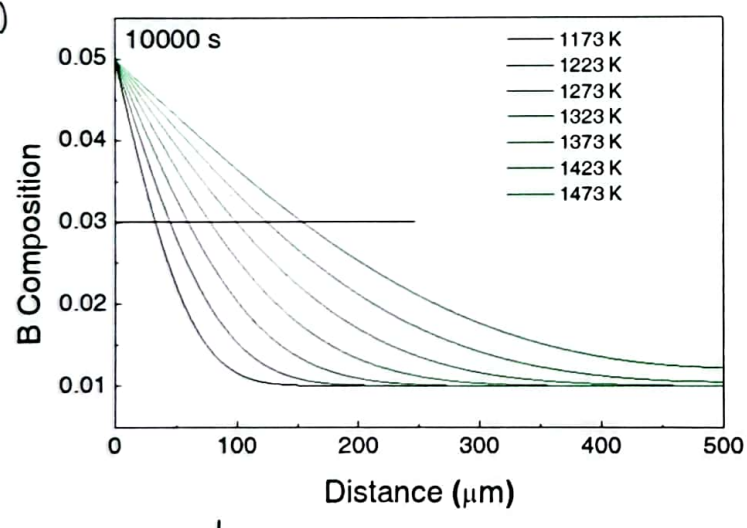


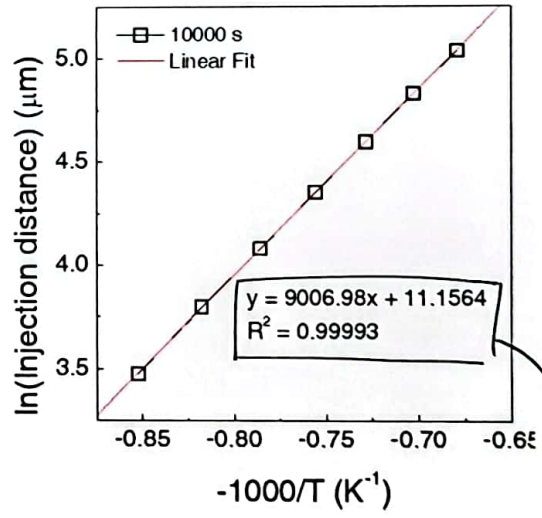


injection distance x 가 $\sqrt{\text{injection time}}$ 과 비례하는것을 육안으로 확인할 수 있다.

수업시간에 배운 이론상 $x=\sqrt{Dt}$ 이기 때문에 잘 맞는다는 것을 육안으로 확인가능하다.

(b)





$\ln x$ 와 $-\frac{1}{T}$ 이 선형관계임을 육안으로 확인할 수 있다.

이 또한 수업시간에 배운 $x=\sqrt{Dt}$, $D=D_0 \exp -\frac{Q}{RT}$ 로 이해 가능하다.

(c) $x=\sqrt{Dt}$, $D=D_0 \exp -\frac{Q}{RT}$

$x=D_0^{\frac{1}{2}} \exp\left(-\frac{Q}{2RT}\right) \longrightarrow \ln x = \frac{1}{2}\ln D_0 - \frac{Q}{2R}\cdot\frac{1}{T}$

$\therefore \ln x$ vs. $(-\frac{1}{T})$ graph 에서 기울기 $= \frac{Q}{2R}$

$\therefore Q = 9006.98 \times 2 \times 8.314 = \underline{149768\ \text{J}}$